

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for the production of an aromatic or hetroaromatic fluorine-labelled compound comprising fluoridation of an iodonium salt of Formula (I) or (II):



wherein:

Q is an electron deficient aromatic or heteroaromatic moiety;

each of R¹, R², R³, R⁴ and R⁵ is independently hydrogen, -O(C₁₋₁₀ alkyl) or C₁₋₁₀ alkyl; and

Y⁻ is a counter ion such as trifluoromethane sulfonate (triflate), perfluoro C₂-C₁₀ alkyl sulphonate, trifluoroacetate, methane sulfonate (mesylate), toluene sulfonate. (tosylate), tetraphenylborate;

to give a product of general formula (III):



where Q is substituted with one or more substituents selected from C₁₋₁₀ alkyl, -O(C₁₋₁₀ alkyl), -C(=O) C₁₋₁₀ alkyl, -C(=O)NR⁶(C₁₋₁₀ alkyl), -(C₁-C₆ alkyl)-O-(C₁-C₆ alkyl), C₅₋₁₄ aryl, -O(C₅₋₁₄ aryl), -C(=O)C₅₋₁₄ aryl, -C(=O)NR⁶(C₅₋₁₄ aryl, C₅₋₁₄ heteroaryl, -O(C₅₋₁₄ heteroaryl),

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Reply to Office Action of July 6, 2009

-C(=O)C₅₋₁₄ heteroaryl, -C(=O)NR⁶(C₅₋₁₄ heteroaryl), C₃₋₁₀ cycloalkyl, -O(C₃₋₁₀ cycloalkyl), -C(=O)(C₃₋₁₀ cycloalkyl), -C(=O)NR⁶(C₃₋₁₀ cycloalkyl), C₃₋₁₀ heterocyclyl, -O(C₃₋₁₀ heterocyclyl), -C(=O)(C₃₋₁₀ heterocyclyl), -C(=O)NR⁶(C₅₋₁₄ heterocyclyl) wherein, when Q is substituted with an electron donating substituent, Q also contains one or more electron withdrawing groups to ensure Q is electron deficient;
and wherein said fluoridation is carried out with a fluoride ion source characterised in that the reaction solvent is either 100% water or a mixture of water and a water miscible solvent.

2. (Cancelled)
3. (Cancelled)
4. (Previously presented) A method as claimed in claim 1, wherein the water miscible solvent is acetonitrile, ethanol, methanol, tetrahydrofuran or dimethylformamide.
5. (Previously Presented) A method as claimed in claim 1 wherein the volume:volume ratio of water:water-miscible solvent is between 1:99 and 1:1.
6. (Original) A method as claimed in claim 5 wherein the volume:volume ratio of water:water-miscible solvent is from 10:90 to 30:70.
7. (Previously Presented) A method as claimed in claim 1, wherein the fluoride ion source is potassium, caesium or sodium fluoride.
8. (Cancelled)
9. (Previously Presented) A method as claimed in claim 1, wherein each of R¹-R⁵ is independently selected from hydrogen, C₁₋₃ alkyl and -O-(C₁-C₃ alkyl).

10. (Previously Presented) A method as claimed in claim 1 wherein, in the compound of Formula II, the "solid support" is polystyrene, polyacrylamide, polypropylene or glass or silicon coated with such a polymer.

11. (Previously Presented) A method as claimed in claim 1 wherein the solid support is in the form of small discrete particles or is a coating on the inner surface of a reaction vessel.

12. (Previously Presented) A method as claimed in claim 1, wherein, in the compound of Formula II the "linker" is C₁₋₂₀ alkyl or C₁₋₂₀ alkoxy, attached to the resin by an amide ether or a sulphonamide bond or a polyethylene glycol (PEG) linker.

13. (Previously Presented) A method as claimed in claim 1
wherein R⁶ is H, C₁-C₆ alkyl, C₃-C₁₀ cycloalkyl, C₃-C₁₀ heterocyclyl, C₄-C₁₀ aryl or C₄-C₁₀ heteroaryl;

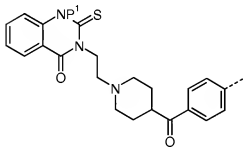
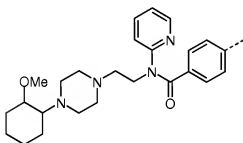
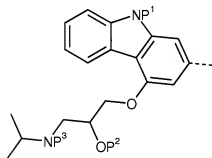
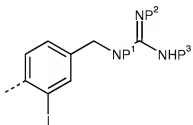
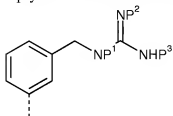
any of which may optionally be substituted with OH, NHR⁶, COOH or protected versions any of these groups; or alternatively

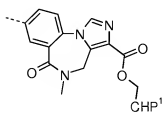
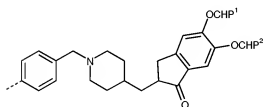
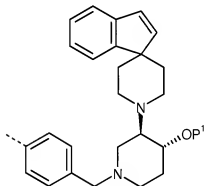
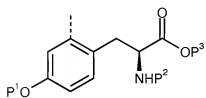
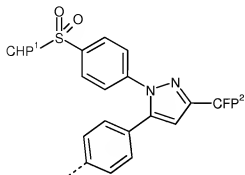
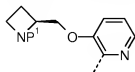
any two adjacent substituents may form a four- to six-membered carbocyclic or heterocyclic ring, optionally fused to a further aromatic, heteroaromatic, carbocyclic or heterocyclic ring.

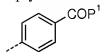
14. (Previously Presented) A method as claimed in claim 1, wherein the aromatic moiety Q has an additional substituent selected from OH, NHR⁶ or halogen.

15. (Previously Presented) A method as claimed in claim 1, wherein the group Q is one of the following:



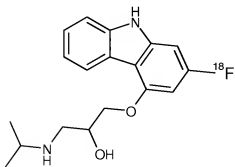
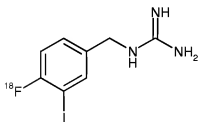
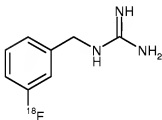
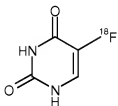


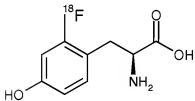


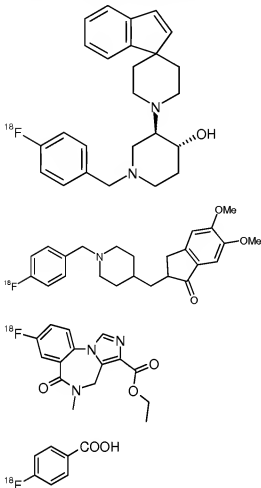


16. (Previously Presented) A method as claimed in claim 1, wherein the fluorine-labelled compound is an [^{18}F]-labelled compound and the fluoride ion source is a source of $^{18}\text{F}^-$.

17. (Previously Presented) A method as claimed in claim 1, wherein the F-labelled compound is selected from the following:







18. (Previously Presented) A method as claimed in claim 1, further including, in any order, one or more of the following steps: removal of excess $^{18}\text{F}^-$, for example by ion-exchange chromatography; and/or

- (i) removal of the protecting groups; and/or
- (ii) removal of organic solvent; and/or
- (iii) formulation of the resultant compound as an aqueous solution.

19. (Original) A kit for the production of an aromatic fluorine-labelled compound, the kit comprising:

- (i) a vial containing an aqueous solvent for dissolving the fluoride ion source; and
- (ii) a reaction vessel containing an iodonium salt.

20. (Original) A kit as claimed in claim 19, wherein the solvent is 100% water.
21. (Original) A kit as claimed in claim 19 wherein the solvent is a mixture of water and a water miscible solvent.
22. (Original) A kit as claimed in claim 21, wherein the water miscible solvent is acetonitrile, ethanol, methanol, tetrahydrofuran or dimethylformamide.
23. (Previously Presented) A kit as claimed in claim 21 wherein the volume:volume ratio of water:water-miscible solvent is between 1:99 and 1:1.
24. (Original) A kit as claimed in claim 23 wherein the volume:volume ratio of water:water-miscible solvent is from 10:90 to 30:70.
25. (Previously Presented) A kit as claimed in claim 19 wherein the iodonium salt is compound of general formula (I) or (II).
26. (Previously Presented) A kit as claimed in claim 20 wherein the iodonium salt is a compound of general formula (II) and the solid support comprises a coating on the surface of the reaction vessel.
27. (Previously Presented) A kit as claimed in claim 19, wherein the reaction vessel is a cartridge or a microfabricated vessel.
28. (Previously Presented) A kit as claimed in claim 19, further comprising a source of fluoride ions.